



# INFORMING DECISIONS

USGCRP coordinates and integrates many efforts across the Federal government to provide access to authoritative, freely-available assessments, datasets, and tools that inform decisions under changing environmental conditions. Interagency science contributes to the development of information tools for managing climate-related risks and opportunities in sectors such as agriculture, transportation, and water resources, including the provision of information at regional scales useful for decision making.

# HIGHLIGHT 13

## Providing climate information tools to agricultural communities

*Interagency efforts develop and deliver science-based information and technologies to help agricultural producers and natural resource managers make optimal management decisions.*

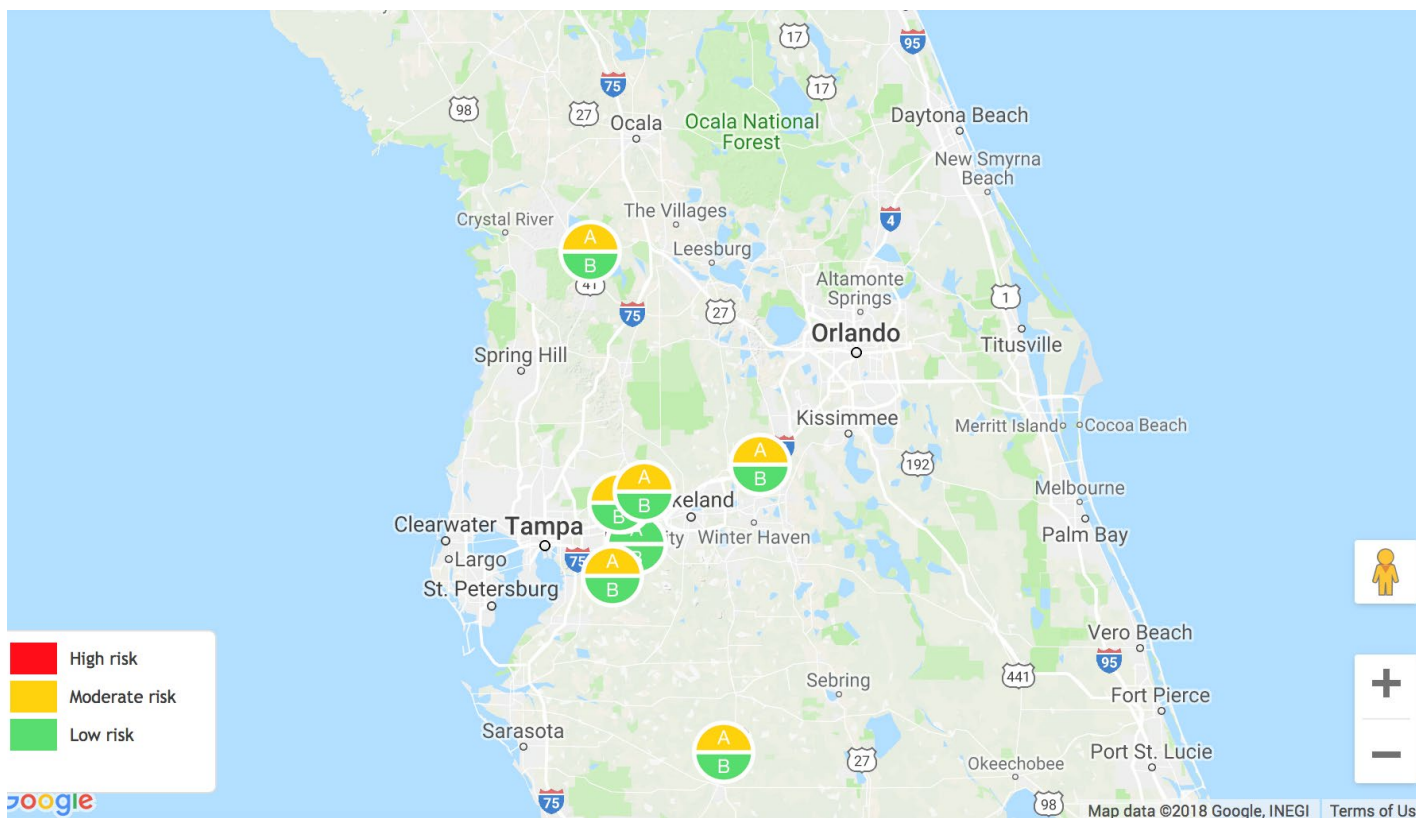
Farmers, ranchers, and land managers across the country rely on weather and climate information in their management decisions. To help producers and managers better understand the risks and opportunities that extreme weather events and climate change present for their operations, interagency efforts produce and deliver a range of information tools and resources that help guide climate risk management in agriculture now and in the future.

USDA's ten regional [Climate Hubs](#), hosted across the country in partnership with the Agricultural Research Service, the USDA-Forest Service, and the Natural Resources Conservation Service, deliver science-based knowledge, tools, and technical support to farmers, ranchers, forest landowners, and resource managers to inform decision-making related to changing climate conditions and risks. Key partners in this effort include NOAA, DOI, public and land grant universities, cooperative extension services, and non-profits providing assistance to landowners. The Climate Hubs offer a variety of information resources that help translate climate change projections into potential impacts on the agriculture and forestry sectors and can inform actions to prepare for changing conditions, including a number of recent examples. The Southern Plains Hub, in collaboration with the Cheyenne and Arapaho Tribes and USDA's Natural Resource Conservation Service, facilitated a new demonstration farm on Tribal lands to showcase the effectiveness of soil health practices in increasing land productivity, reducing environmental impacts, and building resiliency to droughts and floods. The [Southeast Hub's Lately Identified Geospatial Hazard Tracking System \(SERCH LIGHTS\)](#) email alert service, drawn from NOAA datasets, notifies subscribers in the contiguous United States when climate-related conditions of potential concern arise in their area and provides links to supporting resources and management information. Monthly Drought and Cattle Heat Stress alerts are available for the contiguous United States; alerts for the Emerald Ash Borer pest and for fire weather conditions are under development. Finally, the Northeast Hub and its partners have developed a series of Adaptation Factsheets on [cover cropping](#), [managed grazing](#), and [managing dairies in a changing climate](#).

The [AgroClimate](#) web resource, established with funding from USDA, NOAA, and state and regional partners, provides a range of customizable weather and climate decision tools and resources for agricultural producers to support

management of climate risks in both day-to-day decisions and longer-term planning. For example, the [Strawberry Advisory System](#) decision-support tool has been used by Florida strawberry growers assess the risk of epidemics from anthracnose and Botrytis fruit rot on their farms<sup>21</sup>, which are influenced by weather and climate conditions and can reduce yields and profits (see figure). Using the advisories, farmers are able to target fungicide application to periods when conditions are more likely to generate disease, reducing production costs and avoiding unnecessary applications. A number of tools were implemented and revised during the last year, including [rainfall and temperature monitoring](#), a [climatology tool](#), a [growing degree-day calculator](#) and [monitoring tool](#), and a [chill hours calculator](#) and [monitoring tool](#). In addition the [AgroClimate Workbook](#) provides an introduction to the effects of climate on agriculture and is designed to be used in conjunction with decision-support tools and information hosted on AgroClimate.org.





The Strawberry Advisory System tool, which shows risk levels for climate-related disease in strawberry crops, helps growers make decisions about fungicide application. The tool is available at <http://agroclimate.org/tools/sas/>. Source: AgroClimate

The **Useful to Usable (U2U)** research and extension project (funded 2011–2017) focused on improving the usability of climate information for agricultural production in the Midwestern United States. With core funding from USDA-National Institute of Food and Agriculture (NIFA) and by leveraging NOAA datasets and expertise from the NOAA Midwestern and High Plains Regional Climate Centers, an interdisciplinary team from nine universities developed a series of climate-based tools and resources that have supported farm management and planning decisions on millions of acres across the U.S. Corn Belt. A recent evaluation found that farm advisors used U2U tools to assist clients with seed purchases, crop choices, and timing of fertilizer application. Farmers reported using the U2U tools to aid in planting and harvest scheduling, fertilizer management, and improvement of crop yields. U2U decision tools and related user guides continue to be accessible through the [Midwestern](#) and [High Plains](#) Regional Climate Centers and allow users to customize data for a variety of uses and locations, including historical climate and crop yield data (*AgClimate Viewer*), real-time corn growing degree day accumulations and climate risks for corn development (*Corn Growing Degree Day*), and the connections between global climate conditions and local climate impacts (*Climate Patterns Viewer*). Tools for determining the feasibility and profitability of using in-season nitrogen application for corn production (*Corn Split Nitrogen Application*) and exploring the profitability of investing in irrigation

equipment (*Irrigation Investment*) are also available.

The **AgBizClimate** farm-level management tool assesses how climate change could impact costs and returns over the next twenty to thirty years for producers of specific agricultural commodities. Using AgBizClimate, farmers can see the impact of expected climate changes on their cropping system or livestock enterprise in terms of their economic costs and returns, and how changes in farm practices such as technology changes or crop choices may influence the health of their businesses. This tool is a powerful means to help farmers understand their area's available climate information and can also serve as an assessment tool for researchers and government agencies. AgBizClimate is part of a suite of AgBiz Logic™ decision tools that enable agribusiness professionals to make sustainable choices that impact their bottom line. AgBiz Logic™ was developed through a partnership among the USDA Northwest Climate Hub, Oregon State University, Oregon Climate Change Research Institute, and USDA-NIFA. With support from the USDA Climate Change Program Office, efforts are underway to expand participation and use across the USDA Climate Hubs, specifically with the Northwest, Northeast, and Southwest regions and the NOAA RISA Climate Impacts Research Consortium at Oregon State University.

# HIGHLIGHT 14

## Building infrastructure resilience

*Interagency efforts are supporting preparedness and safety measures for critical transportation infrastructure.*

Dust storms in the Southwest can create dangerous and deadly driving conditions, reducing visibility to near zero with very little warning. Interstate 10 is especially vulnerable to dangerous dust-related driving conditions as it passes through a dry lake bed west of Lordsburg near the Arizona border. To help reduce dust-related risks, the NOAA Regional Integrated Sciences and Assessments (RISA) program and the DOT Federal Highway Administration coordinated

with the National Weather Service and the New Mexico Department of Transportation on several public safety and dust mitigation projects. New infrastructure includes static and dynamic warning signs, surveillance cameras to view current conditions, shoulder repair, pavement markings, and other road improvements. Funding also supports new ad and awareness campaigns to promote driver safety and revegetation projects to mitigate dust creation.



*A NOAA National Weather Service (NWS) dust warning to motorists traveling along Interstate 10 near Lordsburg, New Mexico, tweeted in November 2017. Source: NOAA NWS.*



# HIGHLIGHT 15

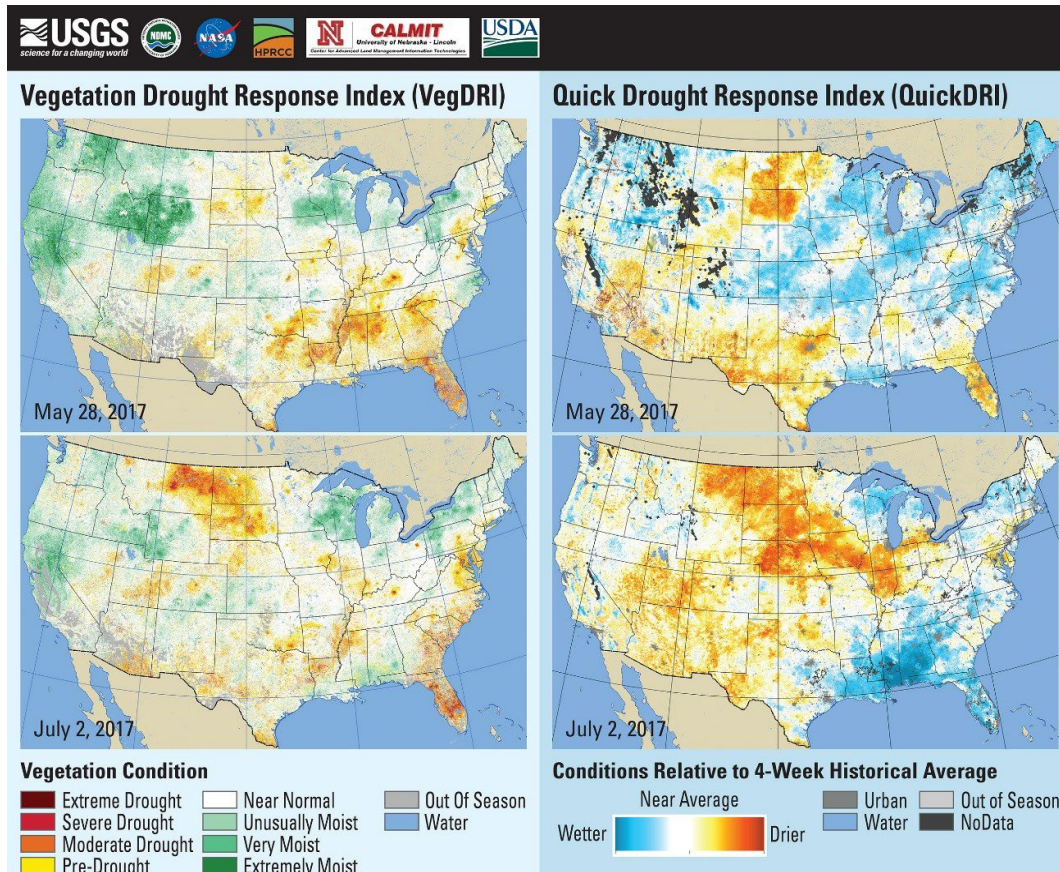
## Supporting informed responses to drought

*Monitoring tools help resource managers prepare for and reduce the impacts of drought.*

The impacts of drought on water resources, plants and wild-fire, agriculture, and the economy are complex and occur over many timescales, underscoring the value of a range of drought monitoring tools that support different types of decisions. To help meet this need, two complementary weekly drought monitoring and mapping tools—the [Vegetation Drought Response Index \(VegDRI\)](#) and the [Quick Drought Response Index \(QuickDRI\)](#)—were developed by the U.S. Geological Survey and the National Drought Mitigation Center in collaboration with NASA, USDA, and the Center for Advanced Land Management Information Technologies. VegDRI and QuickDRI both integrate satellite-based observations of vegetation and soil conditions, climate data, and other environmental parameters across the contiguous United States. VegDRI, in operation since May 2009, depicts the effects of drought on vegetation at a 1-kilometer spatial resolution over seasonal timescales<sup>22</sup>. VegDRI has been useful for depicting drought in the [U.S. Drought Monitor \(USDM\)](#) especially over croplands, rangelands, pastures, and natural grasslands, and is being used by the National Weather Ser-

vice as part of their drought assessment reports and by various state-level drought task forces<sup>23</sup>. QuickDRI, which became operational in 2017, is more sensitive to emerging or rapidly changing drought events (or “flash” droughts) that can have devastating impacts on agriculture, natural resources, and the economy. QuickDRI is designed to be especially useful for crop and rangeland assessments, irrigation scheduling, and wildfire management decisions.

These products are consulted each week by the USDM map team as they assemble the national USDM map and summary narrative, which sets the standard for communicating the location and intensity of drought to a broad audience. Weekly national USDM maps are the most widely consulted gauge of drought conditions across the country, used by policy makers, state drought task forces, media, farmers, and ranchers. Since 2012, the USDM has been used to trigger aid tied to the Farm Bill that has supported ranchers and farmers impacted by drought.



INFORMING  
DECISIONS

VegDRI (left) and QuickDRI (right) for weeks in May and July depicting the evolution of the “flash” drought over eastern Montana, North Dakota, and South Dakota in 2017. Note: No Data in QuickDRI occurs where snow cover is present. Source: USGS.